



ROCC



Communications/Reporting



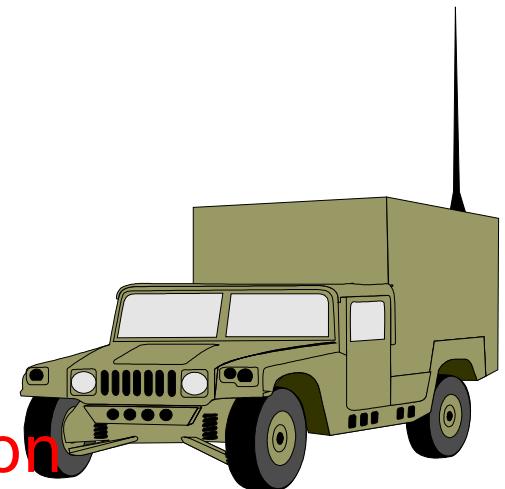
Agenda

- Base Radio Station Concept
- Message Traffic
- LRS Communications Systems
- Digital Capabilities
- Communications Limitations/Constraints



BRS Concept

- What is a LRS Base Radio Station?
 - Portable communications platform
 - Commander's link to deployed teams
- What makes up a BRS?
 - Two identical communications shelters
 - Redundancy
 - Tracking several teams at once
- Who operates and maintains it?
 - LRS Communications Platoon/Section



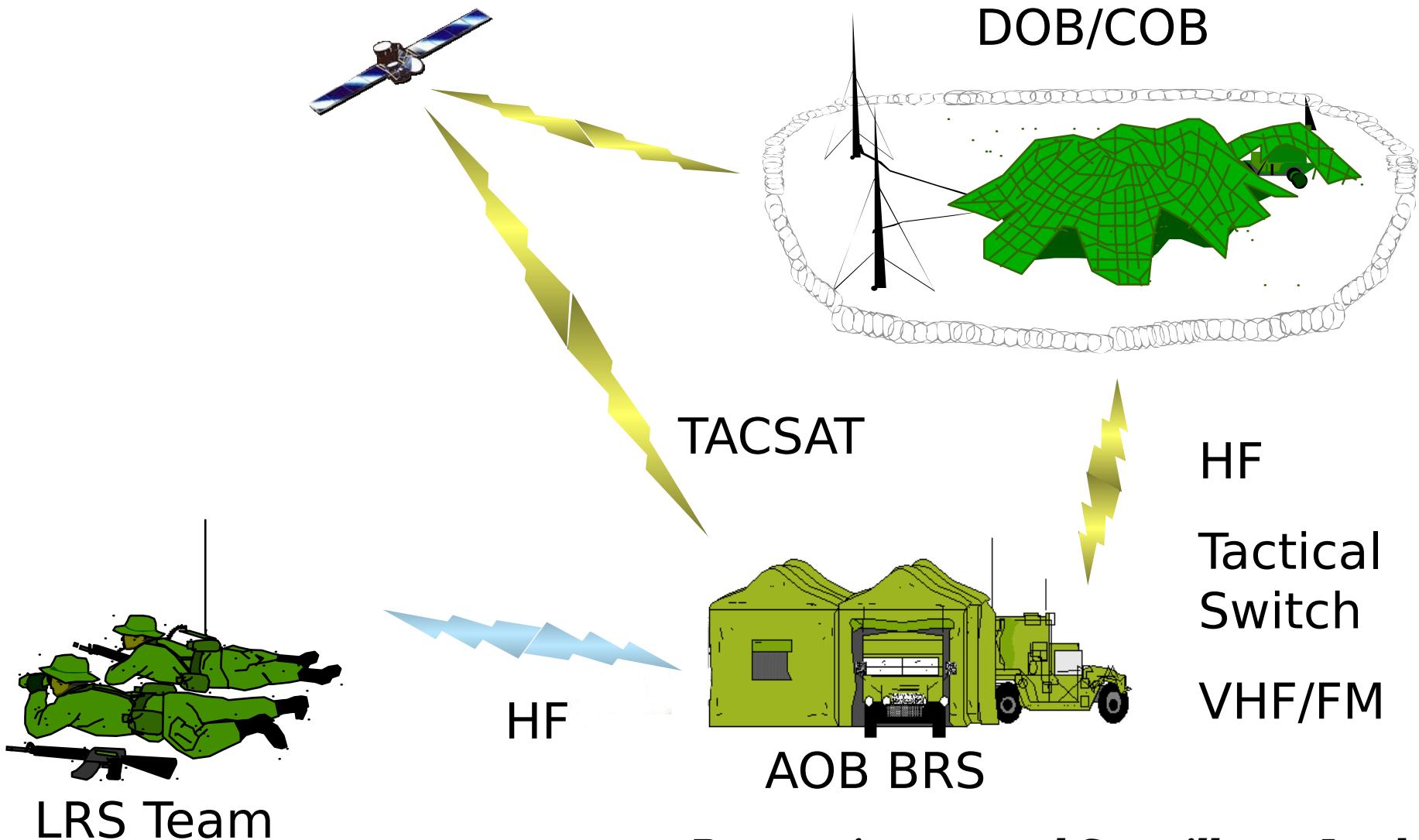


BRS Concept

- DOB/BRS Operations is *the most* critical cell within the LRS communications network
 - Primary link between the Commander and his deployed teams
 - Normally located well within the security umbrella of the Corps or Division Main
 - Close enough to the G2 to run a direct link LAN cable or wire line for reporting
 - AOB may be collocated if communications has been established with teams
 - AOB is always prepared to relocate in order to establish communications or when the COB/DOB relocates



AOB BRS Concept



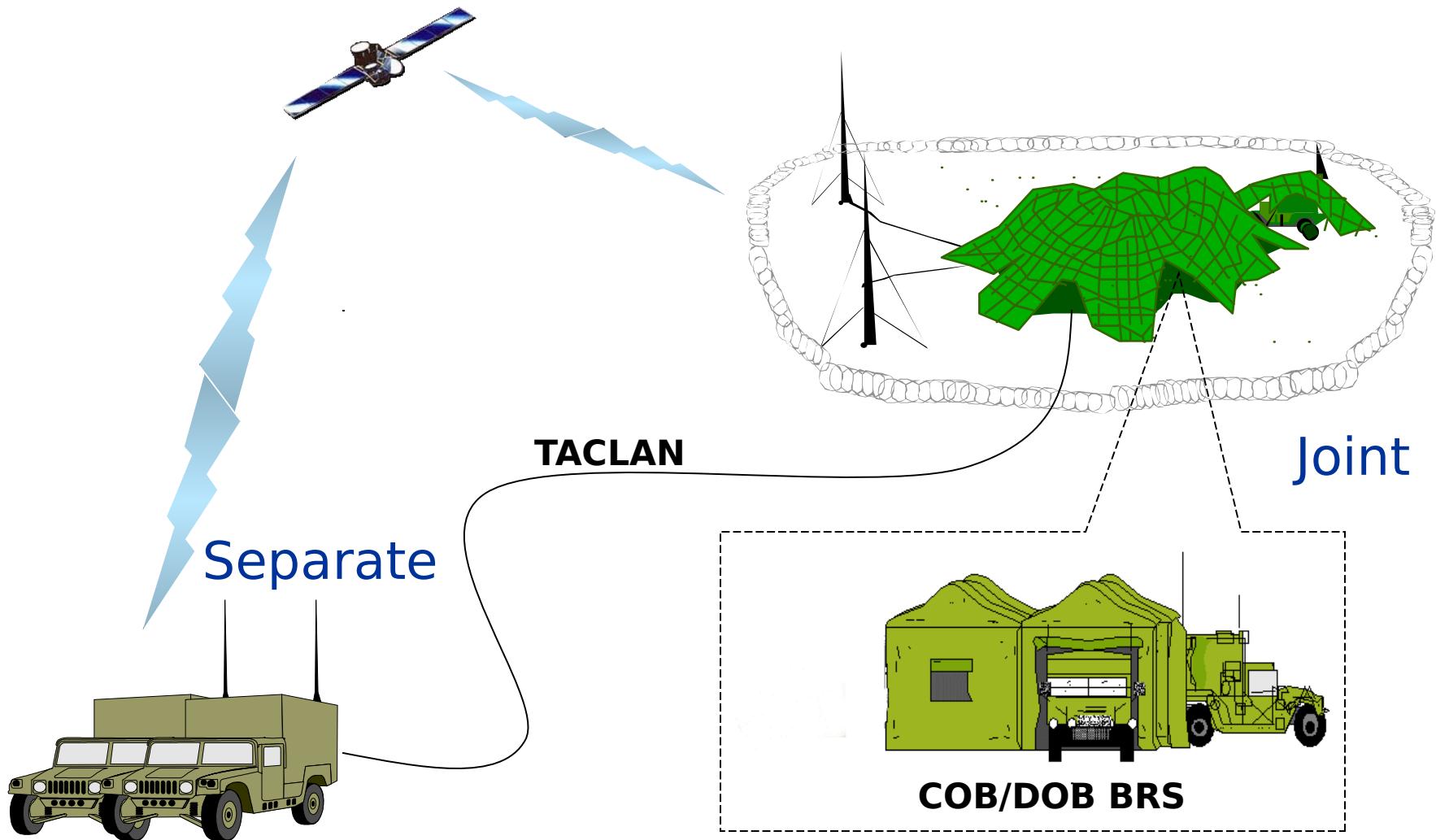


BRS Concept

- Two methods of employing the BRS, **Joint** and **Separate**
 - **Joint:** Attached to the DOB/COB tent, allows face-to-face contact between radio operator and ops cell
 - **Separate:** Detached from the DOB/COB, linked by TACLAN, TACSAT, wire or VHF FM

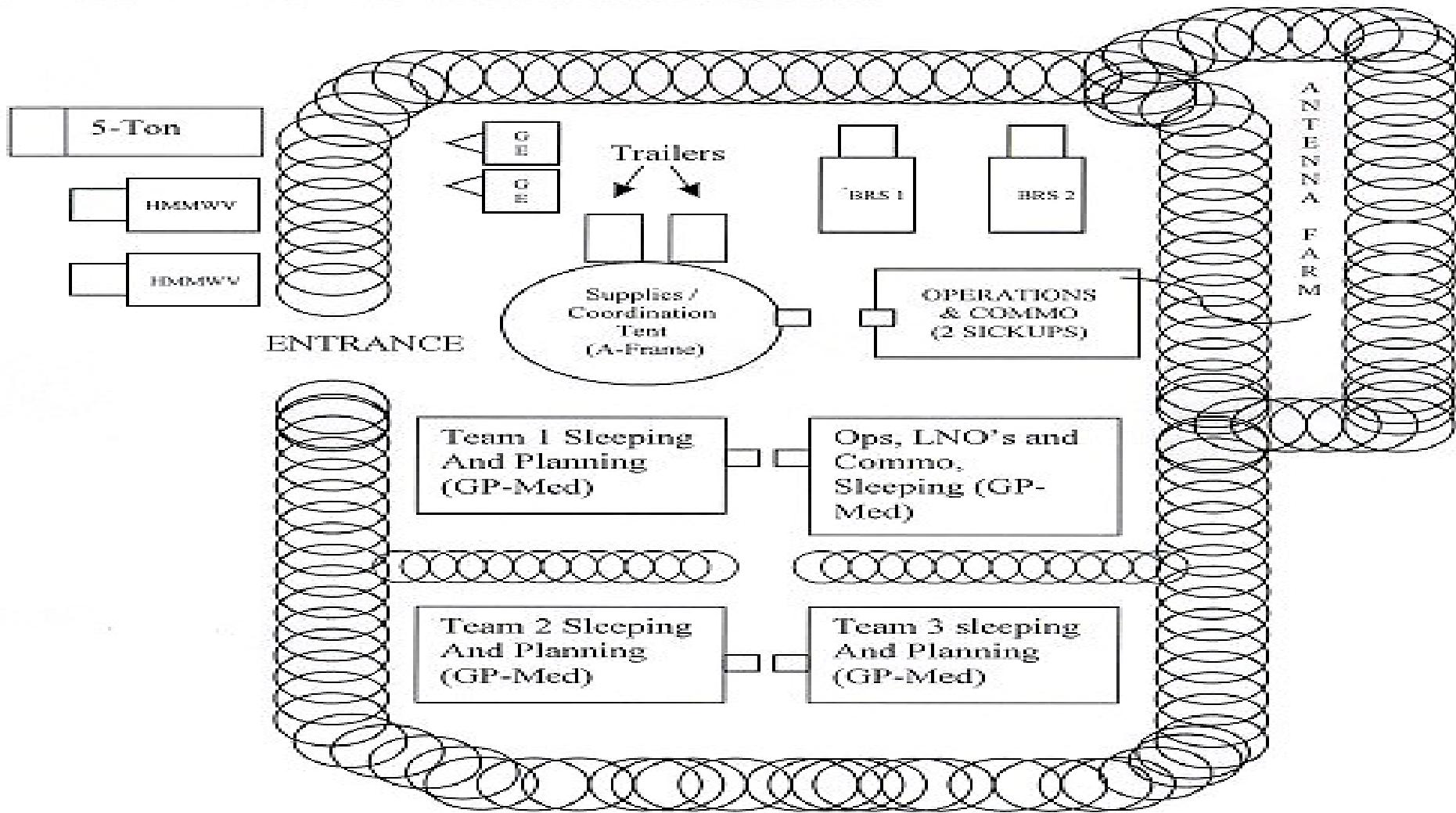


BRS Concept





BRS Concept



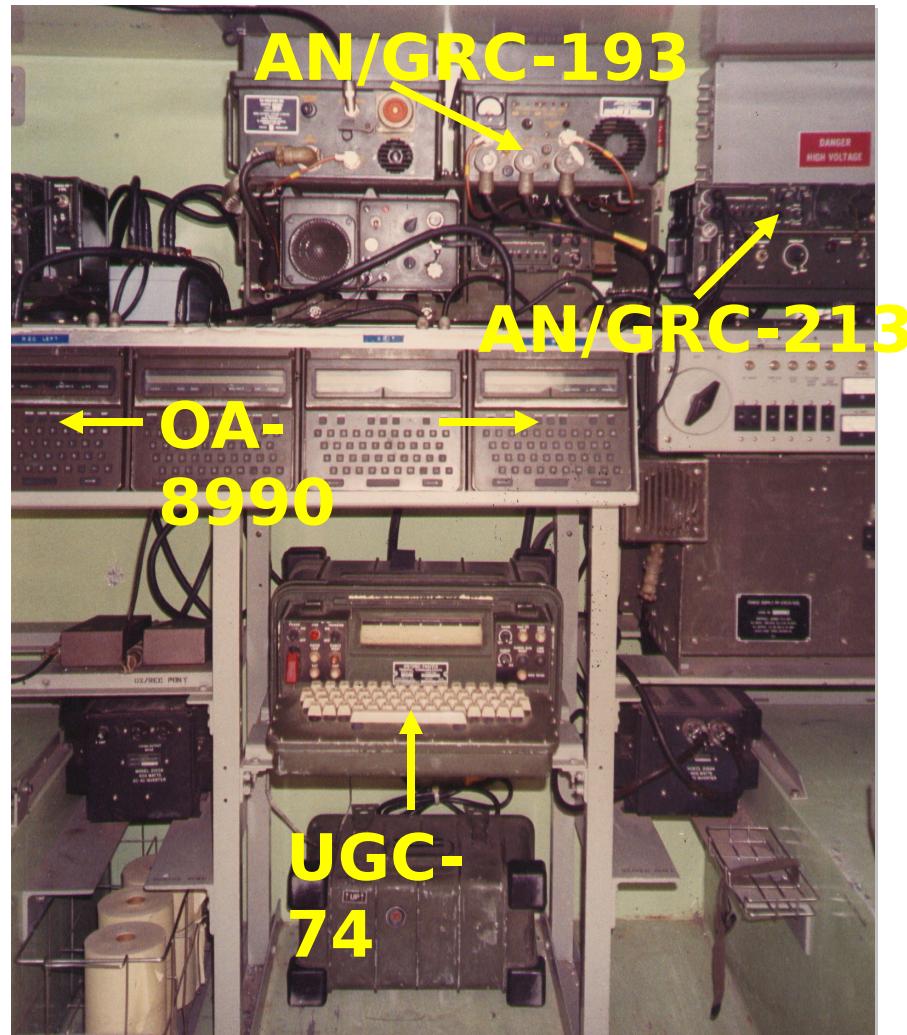


Base Radio Station (BRS)

“Legacy
Equipment” 



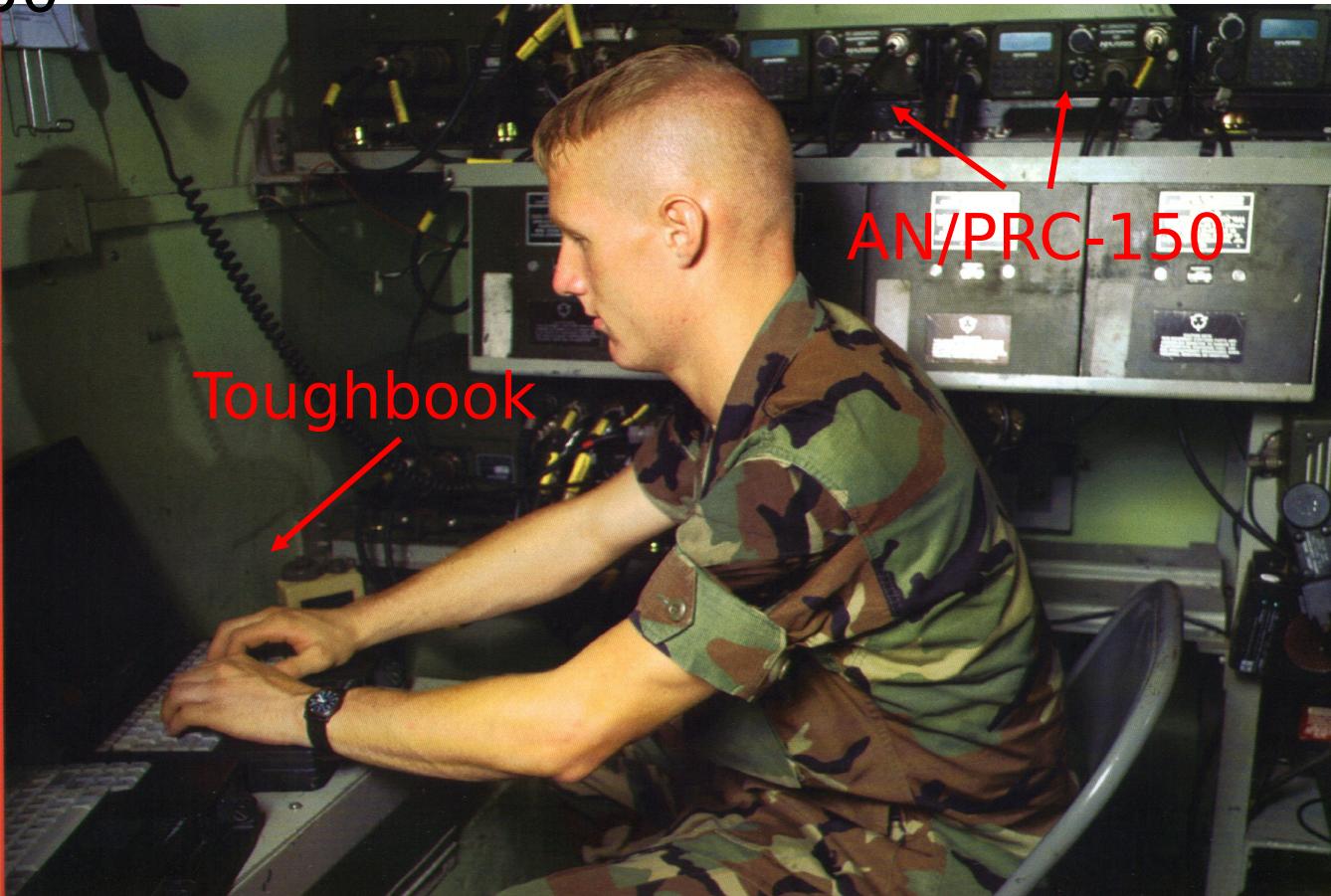
AN/TSC-128





Base Radio Station (BRS)

Legacy IHFR equipment replaced with AN/PRC-150





Message Traffic

- Sending information is the primary mission of any LRS team
- Short, concise, accurate messages are the key
- Structured Message Formats are used by LRSU's to communicate information
- Every LRS Unit has an SOP covering the exact format of all reports

10DE11 MSG02 BORIS GHOST AAA 10 SOLDIERS, 3 VEH, 1 TRAILER, 1 ARTY BBB
MOVING W THRU NAI 3 35 MPH ARTY CENTER CCC GL12345678 DDD UNK/ARTY EEE
250800FEB03 FFF 3 BDRM2, 1 D30, 4 AK47, 4 US LBE, DCU'S, 4 HELMETS GGG
TRAILER HALF FULL W/AMMO BOXES, HELMETS HAVE BLUE CENTER FRONT ACK EOM
RKB



Message Traffic

- Messages include (but not limited to):

Initial Entry Report “ANGUS”

Spot Intelligence Report “BORIS”

Situation Report “CYRIL”

Cache Report “UNDER”

BDA Report “CRACK”

Administrative Report “CLEAR
 ”



CACHE Report Example

“UNDER”

AAA- TYPE OF CACHE (CONCEALMENT, BURIAL, SUBMERSION)

BBB- CONTENTS (ID TYPE & AMOUNT OF ITEMS IN CACHE)

CCC- NUMBER OF CONTAINERS

DDD-INITIAL REFERENCE POINT

EEE-LOCATION (AZIMUTH & DISTANCE FROM REFERENCE POINT WITH DETAILED DESCRIPTION IF NECESSARY)

FFF-DEPTH CACHE IS PLACED

GGG-ANY ADDITIONAL INFORMATION

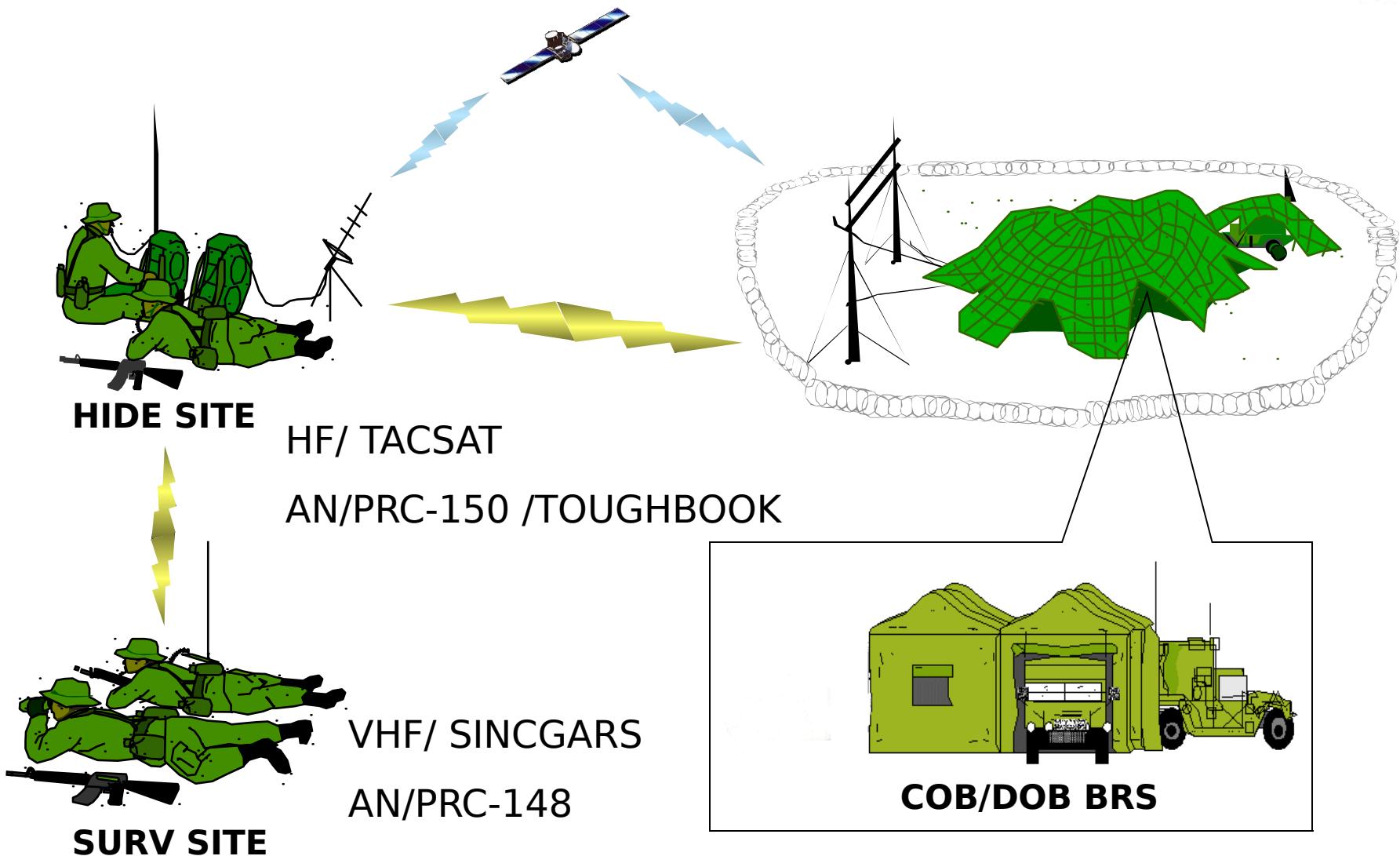


Example Format (BDA)

ADDRESS	MSG NUMBER	PROWORD	DURESS	MSG BODY
10DE11	MSG05	CRACK	HOST	AAA 071200FEB03 BBB
GL123456	CCC	1	T-72	DESTROYED (CATASTROPHIC) 1
BTR-60 DAMAGED (MOBILITY KILL) 15 TROOPS KILLED				
DDD CONFIRMED EEE. ENEMY WITHDRAWING, TEAM				
MOVING TO EXTRACTION POINT		ACK	EOM	RKB
ACKNOWLEDGMENT REQUESTED		END OF MSG	CODENAME	

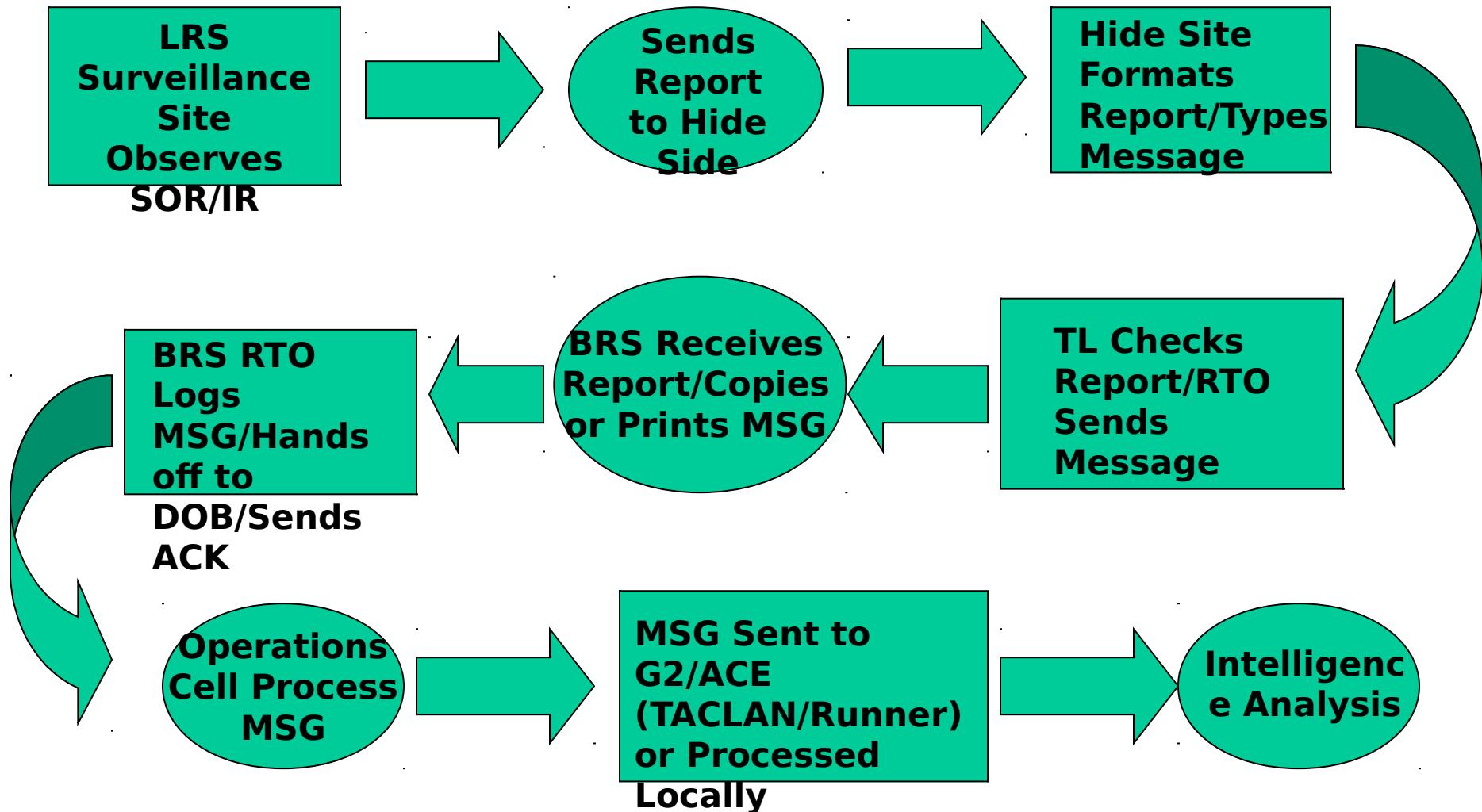


LRS Message Flow





Message Traffic

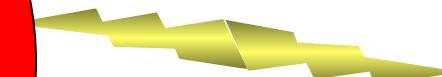




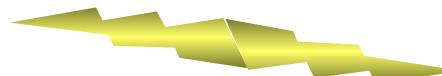
Messaging Devices



SLOW



SLOWER



DR 8990P





Tactical Chat

Tactical Chat

My Station

Auto Save
Save To Location:
C:\Program Files\Har
Save As...
Connections
Harris Radio Conn
Change View
Classic
Set Self Address
Show Time
Ctrl-Enter For Send
Launch At Startup
Sound Alert
Send
Note
Send File

Open

Save

Print

About

Help

Talking To: **all**

Delete Station

10DE11 MSG02 BORIS GHOST AAA 10 SOLDIERS, 3 VECH, 1 TRAILER, 1 ARTY BBB MOVING W THRU NAI 3 35 MPH ARTY CENTER CCC GL12345678 DDD UNK/ARTY EEE 250800FEB03 FFF 3 BDRM2, 1 D30, 4 AK47, 4 US LBE, DCU'S, 4 HELMETS GGG TRAILER HALF FULL W/AMMO BOXES, HELMETS HAVE BLUE CENTER FRONT ACK EOM RKB



No Radio Communications



Tactical Chat



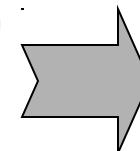
AN/PRC-150(C)



ToughBook CF-



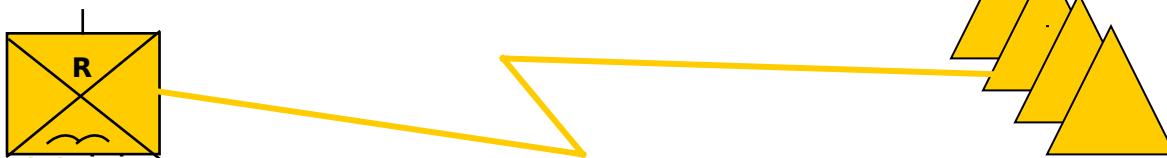
Sent over 3G HF
With TAC CHAT
Message and Photo
Attached





Communications

- LRS teams deploy farther than line-of-sight (LOS) communication range
- Ordinary CNR systems cannot support the reporting requirements of the LRSU. Tactical FM radios, such as SINCGARS, must be in sight of each other electronically to communicate





Communications

Two Tactical Beyond Line-Of-Sight (BLOS) Systems Are:

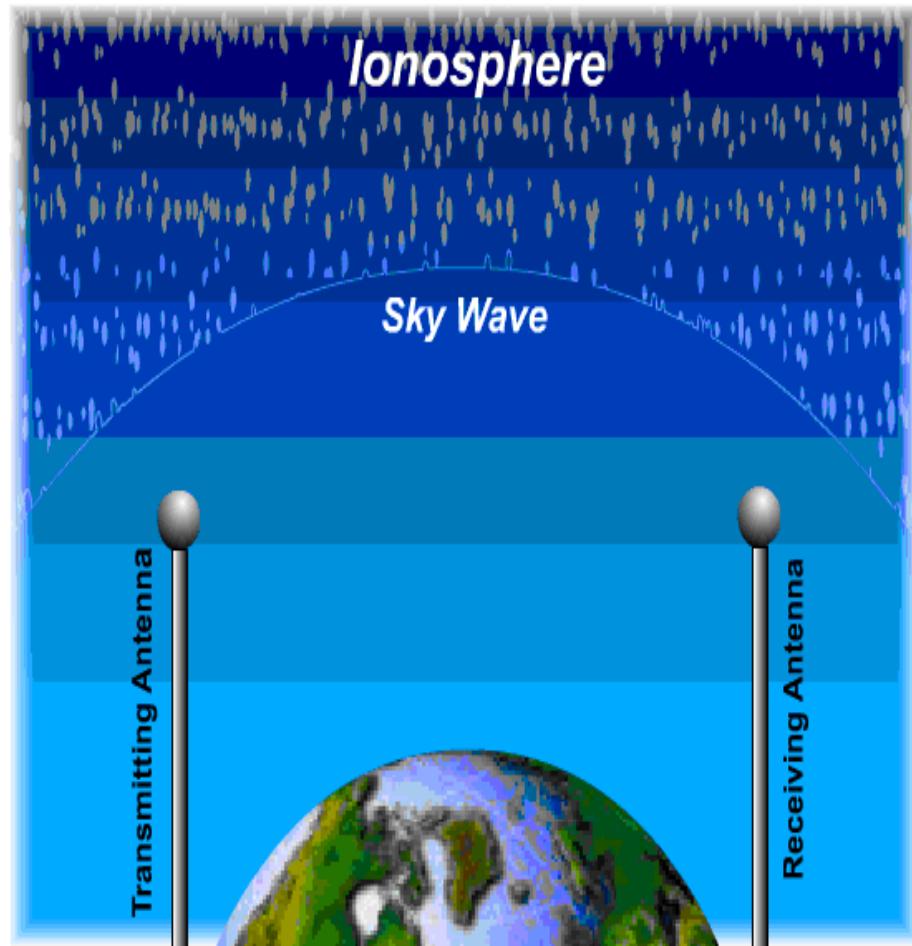
- **Modern High-frequency (HF) Systems**
- **Tactical Satellite (TACSAT) Radios.**





HF Communications

- HF achieves long range communications without the use of satellite relays
- HF radios use the Ionosphere to relay signals
- HF communications can be secure voice or data or both
- New technology and advanced waveforms





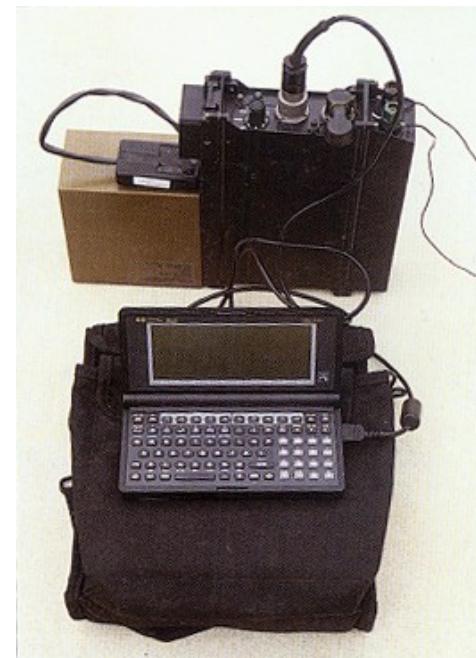
HF Communications

- The two HF radio systems being used in LRS Units are:

AN/PRC-150(C)

AN/PRC-137

- V Corps LRSC is the only LRS Unit currently using the AN/PRC-137





AN/PRC-150

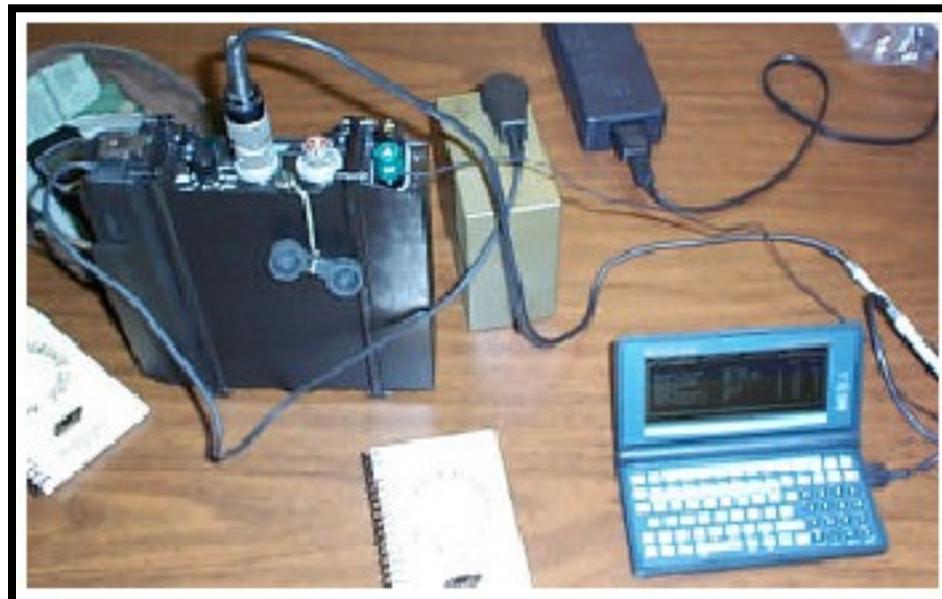
- Frequency Range From 1.6 To 60 Mhz In SSB And FM Modes
- Ability to interface with the Army's SINCGARS radios
- Multi-waveform High Speed Data Rates (Up To 9600 Bps)
- Digital Voice Capability
- **Automatic Link Establishment**
- Easy Interface With Data And Imaging Devices (Digital Cameras, Laptop Computers)
- Frequency Hopping
- Menu-driven Interface
- Advanced Comsec Features





AN/PRC-137

- Primarily used by Special Operations (SF ODA)
- Frequency Range 1.6 To 60 Mhz
- 10 Watt Power Output
- ALE Capable
- Embedded Modems
- Must Be Interfaced With A Data Messaging Device To Operate/Program
- Uses Only One Battery
- Smaller And Lighter Than The AN/PRC-150



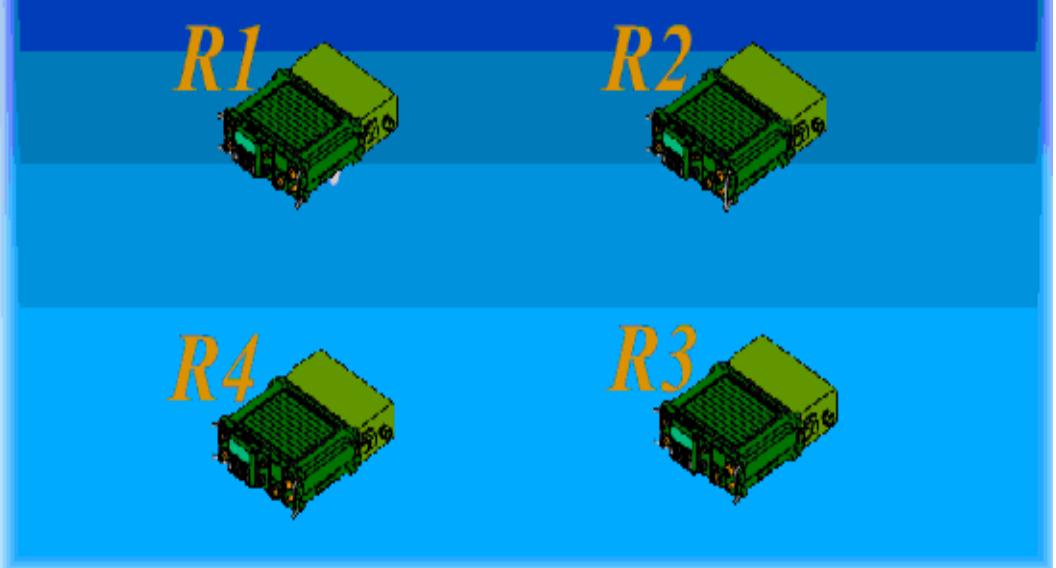


ALE



- Automatic Link Establishment (ALE) is a technique that permits HF radios to automatically call other stations and link on the best HF frequency.
- ALE systems use Link Quality Analysis (or “LQA Scores”) stored in memory.

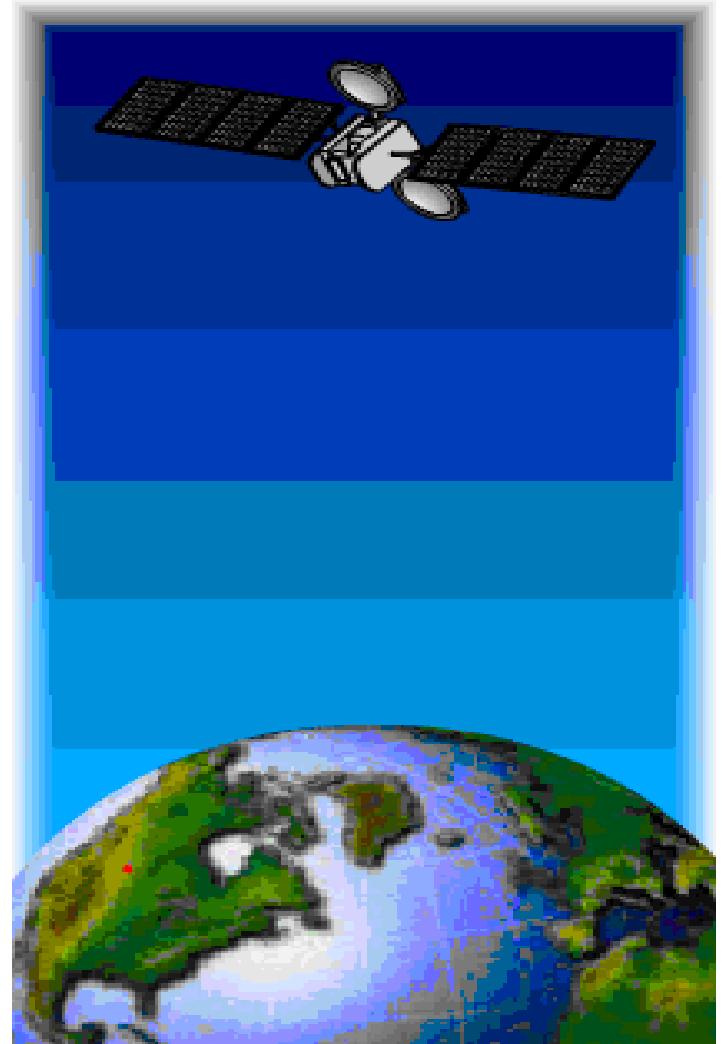
Channel	Frequency	Scores for R2	Scores for R3	Scores for R4
1	2.5 MHz			
2	4.0 MHz			
3	5.5 Mhz			
4	7.0 MHz			





TACSAT

- TACSAT Radios are also used by LRS for BLOS communications
- Can be used for both voice and data
- Advantages over HF:
 - Speed
 - Easy to operate
 - Faster data transfer speeds
- **Satellites have become overcrowded**





DAMA

- Demand Assigned Multiple Access (DAMA)
- DAMA Allows many more users to access a satellite at once
- Also knows a “narrow-band” channel
- Each user must have an address that is in the GCS database
- No more “bootlegging” of satellites
- GCS has complete control of resources





SATCOM Radios

**Two DAMA capable
SATCOM Radio
Systems in use today
by LRS Units are:**

-An/PRC-117

-An/PSC-5 Spitfire





AN/PRC-117





AN/PRC-117

- **Multi-band/multi-mission radio system**
- **Provides continuous coverage over the full 30-512 MHz band**
- **State-of-the-art modem technology (High Performance Waveforms)**
- **Interoperable with a wide variety of existing military and civilian communication systems**





Advantages of AN/PRC-117

- Designed to provide the most advanced tactical communications technology available in one single package.
- Microprocessor-based
- Software-controlled (vs hardware)
- Radio can be tailored to fit any unconventional, conventional or data/automation mission requirement
- More user-friendly and cost-effective when compared to current "standard" equipment



Advantages of AN/PRC-117

- Can be used as a bridge between two different communications systems (SINCGARS to SATCOM, SABRE to SINCGARS)
- Easy interface with standard laptops or Toughbooks through Data Port
- Uses Wireless Messaging Terminal (Outlook E-mail)
- Can be used as a Gateway to WWW (Standard E-mail to WMT)
- Retransmit capabilities (example UHF AM to VHF FM)



AN/PRC-117F

- Manpack, vehicular, marine and base-station configurations
- Built-in ECCM and COMSEC capability
- Voice/data retransmission across traditional frequency bands and waveforms
- Data rates up to 64 kbs with built-in interfaces
- Full remote-control capability (all functions)
- Longer battery life due to low voltage logic design
- Multiband scanning
- 100-channel presets for fixed frequency



AN/PRC-117F

- **Optional Global Positioning System interface for navigation and time signals**
- **Software-reprogrammable to accommodate evolving waveforms, ECCM, COMSEC, signal processing and modulation techniques**
- **Dual antennas for optimal performance (30-512 mHz).**



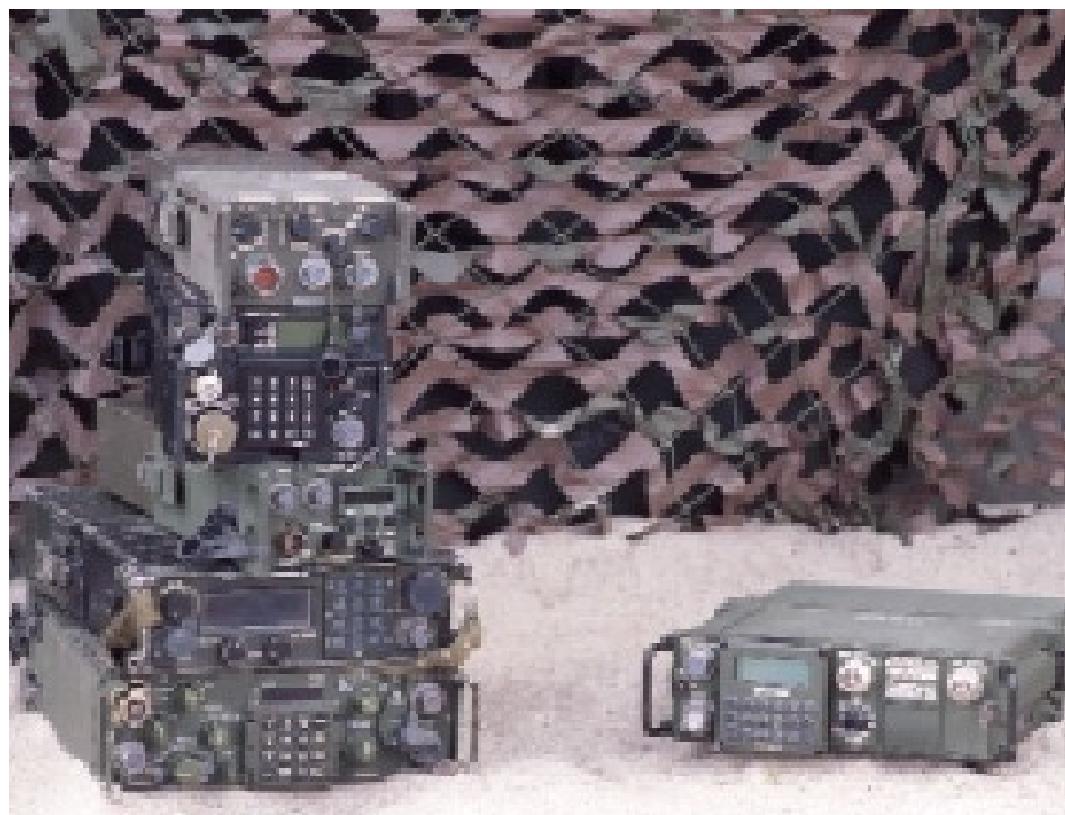
Technical Data

- **Frequency Range:** 30-512 MHz
- **Net Presets:** 100, fully programmable
- **RF Impedance:** 50 Ohms nominal
- **Power Input:** 26 VDC (20.5-32 VDC)
- **Radio Weight:** 9.8 lbs. without batteries
- **High Speed Data:** 48/64kbps (Option)
- **Transmitter Output:** FM: 1-10 Watts AM: 1-10 Watts
- **Environmental:** Per MIL-STD 810E
- **Immersion:** 3 ft. (.9m) of water
- **Operating Temperature:** -40°C to +70°C



AN/PRC-117F

“Swiss Army Knife” Radio System



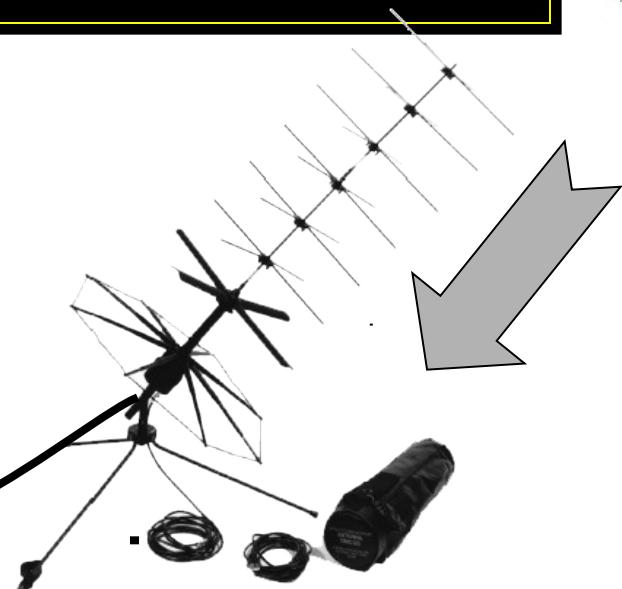


Applications





Applications

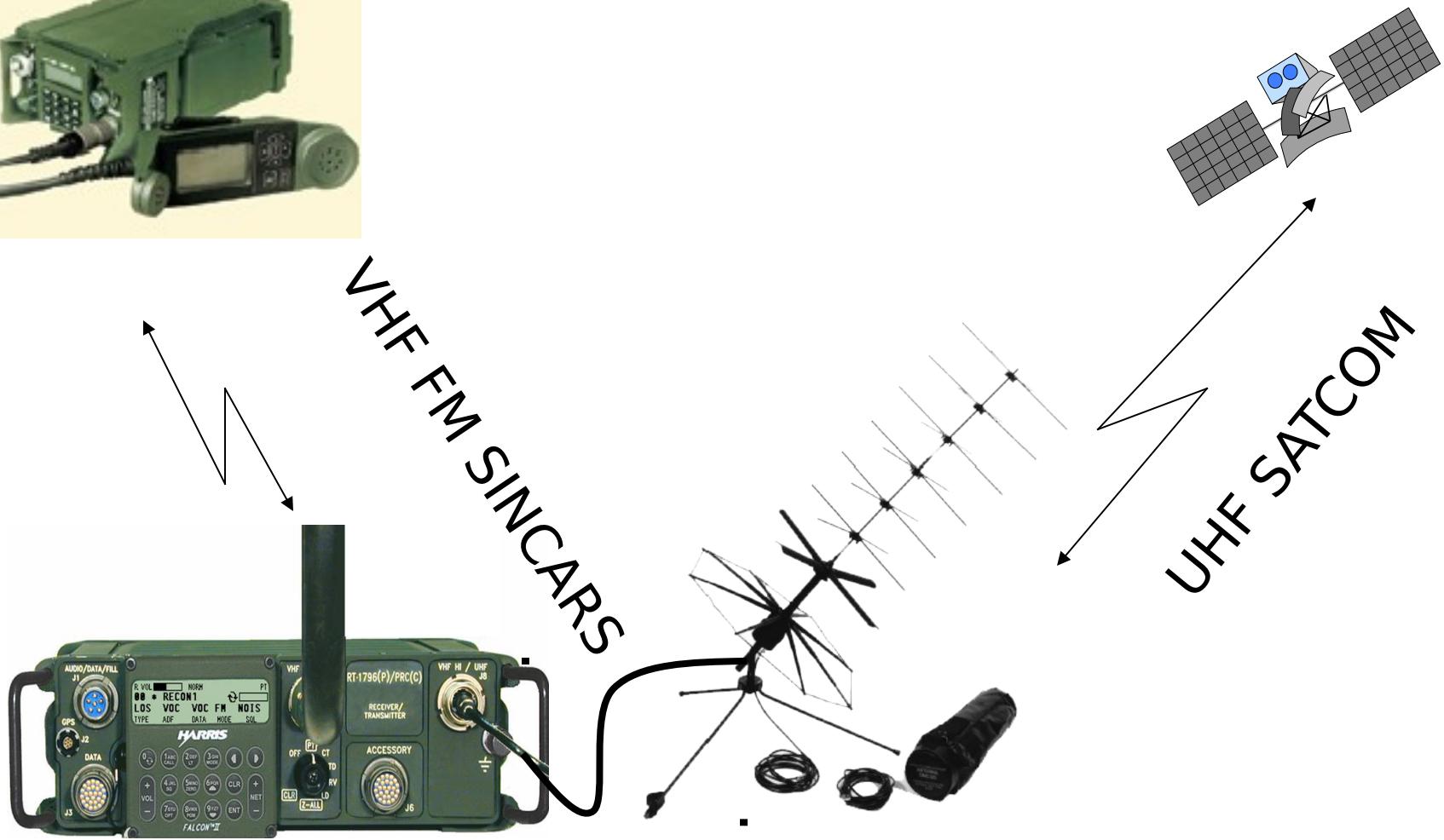


Base Station





Retransmit

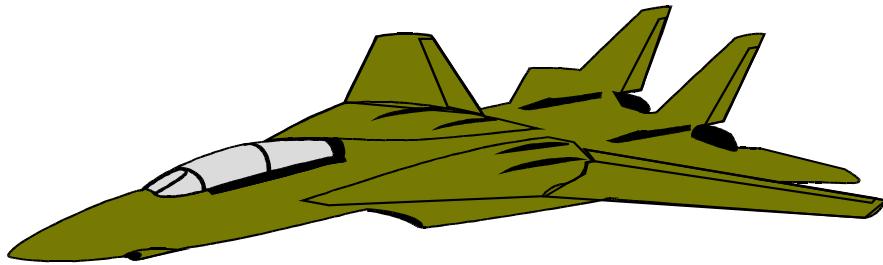




Retransmit



VHF FM

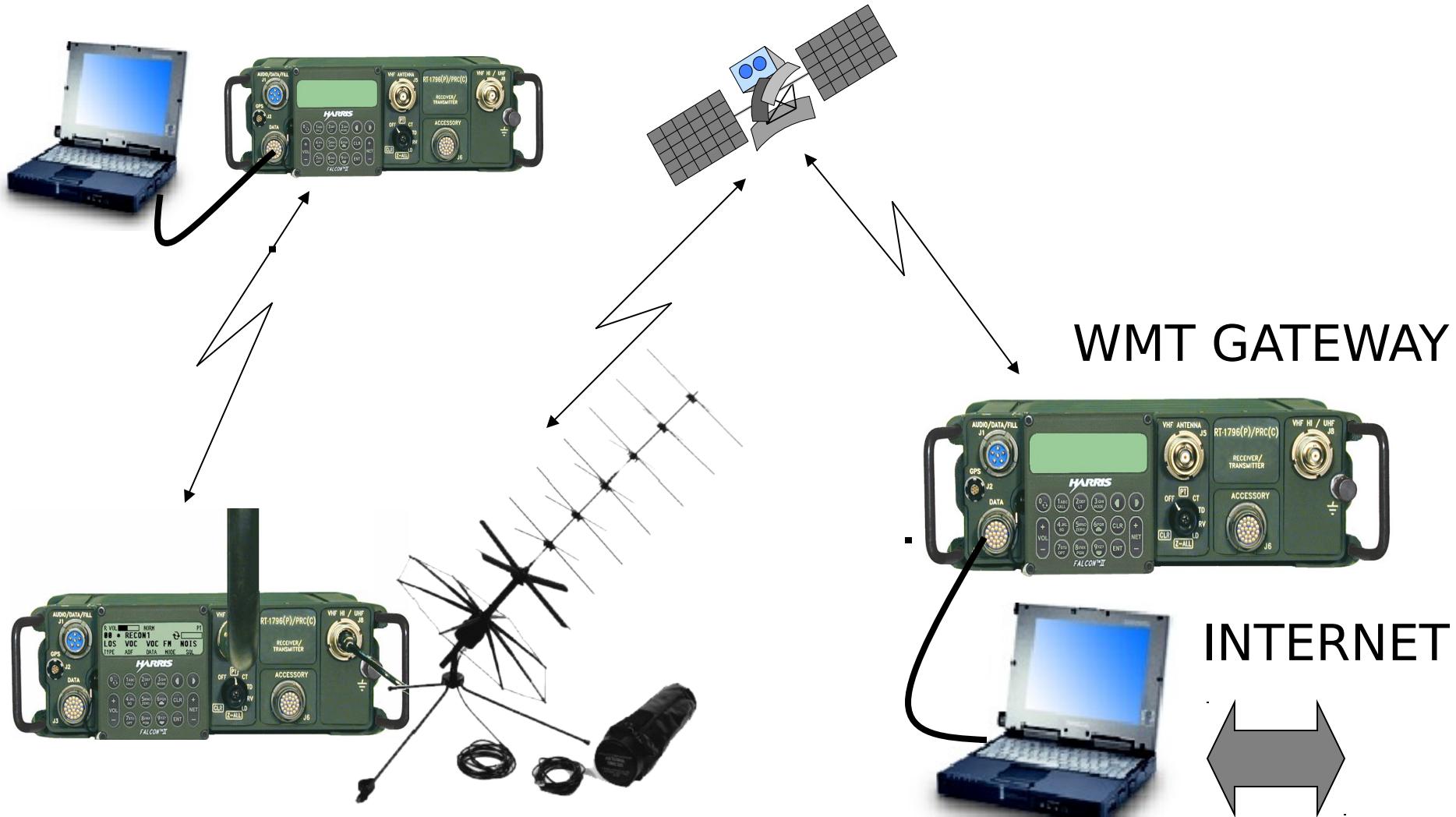


UHF AM





Data Retransmit





AN/PSC-5 Spitfire



Reconnaissance and Surveillance Leader



AN/PSC-5 Spitfire

- Supports army special operations forces C2 in war and operations other than war
- UHF band from 225.0 megahertz (MHz) to 399.995 MHz
- Provides narrowband voice, 5-kilohertz (kHz) and 25-kHz (Wideband) operation
- 5-kHz DAMA and Demand Assigned Single Access (DASA) operation
- Half Duplex (HDX) SATCOM and line of sight (LOS) communications





AN/PSC-5 Spitfire

- Frequency Range 30-400 MHz
- Modes: UHF LOS and SATCOM ,including DAMA
- Size: 403 cubic inches
- Weight: 11 pounds
- Digital Voice: LPC-10e
- Applications: Manpack, Airborne, Vehicular, Fixed Station
- COMSEC: KY-57/58, KY-99/: YV-5, KGV-11





AN/PRC-148 MBITR



Reconnaissance and Surveillance Leader



AN/PRC-148 MBITR

- Multi-Band Intra-Team Radio (MBITR)
- Secure hand-held, lightweight radio
- Incorporates frequency-hopping technologies that are compatible with the SINCGARS radios systems
- Multi-purpose radio that can be used to communicate with other elements of a joint task force (including fixed and rotary winged aircraft), are ideally suited for LRS and reconnaissance operations.





AN/PRC-148 MBITR

- **30-512 MHZ CONTIGUOUS FREQUENCY COVERAGE**
- **AM/FM; VOICE/DATA**
- **SELECTABLE RF OUTPUT POWER**
- **US TYPE 1 COMSEC**
- **IMMERSIBILITY**
- **20 METER MARITIME VERSION**
- **2 METER URBAN VERSION**
- **LESS THAN 29 OUNCES, 34 CUBIC INCHES**
- **SINCGARS SIP/HAVEQUICK II OPTIONAL**





Technical Data

Modulation Types:

AM and FM (Software)

Transmit Output Power:

0.1, 0.5, 1.0, 3.0 & 5.0 watts (FM)
1.0 & 5.0 watts (AM)
User Selectable

Emergency Beacons and GPS:

AM Swept Tone Beacon
GPS Interface to PLGR

Programmable Channels:

100 Memory Preset Channels
Menu Selectable Groups
User Programmable from:
Front Panel Menu
PC Programmer
Radio-to-Radio Cloning

Controls:

On/Off/Volume/Whisper/Zeroize Knob
16-Position Channel Select Knob
Large Tactile Push-To-Talk Switch
Squelch Override Push-button
Backlit 7 Button Keypad (NVG Compatible)
2 Software Configurable Option Keys

Indicators:

32 x 80 Pixel Backlit LCD (NVG Compatible)
Intuitive Menu Driven User Interface
Channel Name/Frequency
Group Name
Clear/Secure Mode
Key Location
Battery Capacity
Transmit Power



Technical Data

Connectors:

50 Ohm TNC Antenna

10 Pin Multi-function

Immersion Sealed Top Connector
(20M)

6-Pin Multi-function Top Connector
(2M)

18-Pin Side Connector for
Extended Capabilities and Upgrades

COMSEC:

US Type 1

VINSON & FED-STD-1023

Selective Key Zeroization

Panic Radio Zeroization with
Mechanical

Interlock Protection

Receive OTAR Compatible

6 Key Locations

Physical Parameters

(with battery):

Length: 8.44 inches (21.44 cm)

Width: 2.63 inches (6.68 cm)

Depth: 1.52 inches (3.86 cm)

Volume: 33.74 cu. inches (552.8
cubic cm)

Weight: 30.6 ounces (867.5 gm)

Environmental Specifications:

Temperature:

Operating: -31° to +60° C

Storage: -33° to +71° C

Humidity: 95% non-condensing

Shock: EIA-603-1992

Vibration: EIA-603-1992

Altitude: 30,000 Feet



Technical Data

Batteries:

Rechargeable Lithium-Ion

3000 mAH

>8 Hours Life at 5 Watts*

Non-Rechargeable Battery Holder

Commercial Lithium Cells

10 Hour Life at 5 Watts *

*** Standard Duty Cycle (8:1:1)**

Antenna Set:

30-90 MHz

30-512 MHz

Accessories:

Vehicle Adapter

Radio Holster

Radio System Carrying Bag

AC Powered Single Battery Charger

AC/DC Powered 6-way Battery Charger





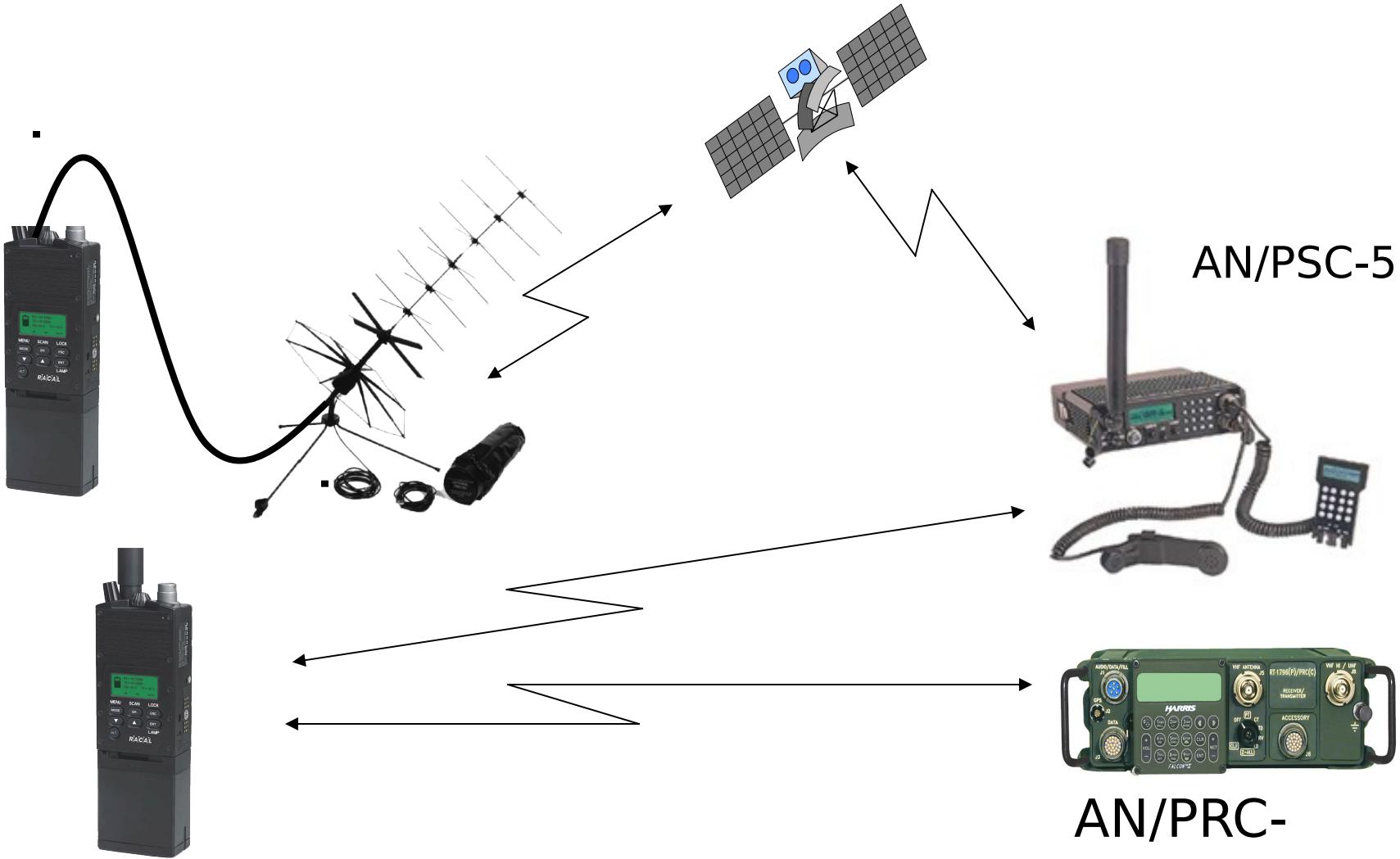
Applications

LOS- Surveillance to Hide
Inter-Team Communications





Applications





Toughbook

- Ruggedized standard laptop computer
- Used as a data terminal device for the radio
- Used to send and receive reports and images
- Communicates to the radio through the serial port or synchronous data controller card (ViaSat)
- Can be powered by a BA-5590 or BB-390 with an adapter
- Can use “Tactical Chat” application for real time free text communications (no ViaSat card required)
- Wireless Messaging Terminal (HPW) uses “Outlook” e-mail to communicate over SAT/HF (VDC-200 or VDC-400)
- Interfaces with any standard digital camera





Toughbook

- Full magnesium alloy case
- Moisture- and dust resistant LCD, keyboard and touchpad
- Sealed port and connector covers
- HDD is mounted in shock-absorbing gel
- Ruggedized port replicator connector
- Rugged and dust-resistant LCD hinges
- Ultra Low Voltage Mobile Pentium Processor
- Touchscreen Display 8.4" 800 x 600 (SVGA)





Toughbook Models

- **Fast CPU**
- **Large HD**
- **Touchscreen**
- **Expensive**
- **Laptop Size**
- **Base Station Use**



CF-72



Toughbook Models

- Smallest Model
- Touchscreen
- Fast CPU
- Large HD
- Team Use

CFM-34





Toughbook Models

- Older Model
- Slower CPU
- Smaller HD
- Less RAM
- Still in use
- Cannot buy new



CF-27



Limitations/Constrain

ts

High Frequency Radio Limitations and Constraints

- Planning Considerations
 - Planning Ranges
 - Operations in Unusual Conditions
- ALE Network Profiles (RPA) Development
- Frequency Management
- Training (operators/communications personnel)
- Enforcing HF ALE as primary means of communications
- ~~Equipment (MTO&E vs Retainage equipment)~~
Retainage equipment Leadership



Limitations/Constrain

ts

TACSAT Radio Limitations and Constraints

- Planning Considerations
 - DAMA Terminal Address Assignment
 - DAMA Order-wire Key
- Getting through on a DAMA channel
- Training (operators/communications personnel)
- Equipment (MTO&E vs. the right equipment)
- Relying on SATCOM and loosing HF skills